Mississippi State University
Notice of Proposed Sole Source Purchase

256-073

Mississippi State University anticipates purchasing the item(s) listed below as a sole source purchase. Anyone objecting to this purchase shall follow the procedures outlined below.

1. **Commodity or commodities to be purchased (make, model, description):**

This proposal is for an Anton Paar MCR 703 MultiDrive Axial-Torsional Dynamic Mechanical Analyzer (DMA) and Rheometer capable of providing viscoelastic and thermomechanical properties of a large range of specimen types: thin films, gels, powders, liquids, solids, and fiber matrices.

2. **Explanation of the need to be fulfilled by this item(s), how is it unique from all other options, and why it is the only one that can meet the specific needs of the department:**

   There are 3 unique aspects of this instrument that are required by this research into materials for nuclear facilities.

   a) The simultaneous nature of the axial-torsional movement is unique to this instrument; these two measurements are sequential on one loaded sample without removing any parts or changing the fixtures and clamps. No other DMA permits moving from torsion to tension in one test method on one sample loading. Conventional DMAs and universal tests allow determination of the strength of a material in a single dimension, such as torsion, tension, compression, or shear, without fixture changeout. This instrument is the only one capable of combined axial and torsional measurements within one single test and with minimal sample sizes, curtailing the need for three separate instruments or exposing the sample to improper conditions between testing. This replicates real-world service situations more accurately by replicating complex, multi-directional movements and allows determination of the endurance and performance of each material over time and throughout conditions.
   b) The range of materials for analysis is also unique; the MCR 703 is suitable to measure ultra-low viscosity liquids (like solvents in the range of 0.5 mPas) to pure solids like steel (over 100 GPa). In between the extremes, the samples can range in form including liquids, powders, slurries, pastes, gels, foams, creams, melts, crosslinked elastomers, films, fibers, discs, and bars.

c) The torque specifications for these measurements are unmatched by other instruments. The range of materials and torque minimum for the rotational drive are 1 nNm for rotation and 0.2 nNm for oscillation. The resolution for the torque is 0.05 nNm, surpassing all others, and this resolution is needed for the minute changes in materials used in nuclear facilities.

Materials used in nuclear filtration systems present unique characterization requirements. Various types of materials are used as components of these systems and different process gas treatment durability and longevity is vital to investigate for each.

3. **Name of company/individual selling the item and why that source is the only possible source that can provide the required item(s):**

Anton Paar is the only company providing a simultaneous axial-torsional DMA / TMA/ rheological instrument and modularization opportunities for five functionalities with environmental conditions (heat to 600 °C and relative humidity ranges).

4. **Estimated cost of item(s) and an explanation why the amount to be expended is considered reasonable:**

Our quoted price for this item is $221,974.
The price for separate instruments performing the same analyses: The price for a DMA with axial and torsional (though not simultaneous) fixtures could be around $128,920.00. Thermomechanical analysis (TMA) would be $95,560.00, and $35,000 for a rheological instrument, which would equal a sum of $259,480.00. Additionally, this DMA can perform fatigue testing, and typical fatigue test instruments can cost $150,000. To purchase a TMA, DMA, rheometer, and fatigue tester could be roughly $359,480.00 if purchasing separate instruments.

5. **Explanation of the efforts taken by the department to determine this is the only source and the efforts used to obtain the best possible price:**

DMA and TMA along with rheological systems were researched for 2 years with no finding of simultaneous axial-torsional capability. Also, 2 years of fatigue tester research was conducted.

Any person or entity that objects and proposes that the commodity listed is not sole source and can be provided by another person or entity shall submit a written notice to:

Jennifer Mayfield, CPPO
Director of Procurement & Contracts
jmayfield@procurement.msstate.edu
Subject Line must read “Sole Source Objection”

The notice shall contain a detailed explanation of why the commodity is not a sole source procurement. Appropriate documentation shall also be submitted if applicable.

If after a review of the submitted notice and documents, MSU determines that the commodity in the proposed sole source request can be provided by another person or entity, then MSU will withdraw the sole source request publication from the procurement portal website and submit the procurement of the commodity to an advertised competitive bid or selection process.

If MSU determines after review that there is only one (1) source for the required commodity, then MSU will appeal to the Public Procurement Review Board. MSU will have the burden of proving that the commodity is only provided by one (1) source.